

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1 – 41 (canceled)

Claim 42 (new): A method for identifying the presence of a toxic substance in a sample using a luminescent biological agent, said method comprising the steps of:

preparing a luminescent biological agent which is inhibited by a substance which is toxic to an organism;

obtaining a sufficient volume of the sample suspected to contain toxic substances which are toxic to an organism to provide a test sample;

separating the toxic substances using a separation phase matrix to provide separated toxic substances;

collecting said separated toxic substances by elution from the separation phase matrix into a plurality of serial aliquot volumes; and

identifying the presence of said toxic substances harmful to an organism in said aliquot volumes by luminescent inhibition.

Claim 43 (new): The method of claim 42 wherein the luminescent biological agent is a luminescent bacteria.

Claim 44 (new): The method of claim 43 wherein the luminescent bacteria is selected from the group consisting of *Photobacterium leiognathi*, *Photobacterium phosphoreum*, *Vibrio Fischeri* (ATCC Acc. No. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843).

Claim 45 (new): The method of claim 44 wherein the luminescent biological agent is *Vibrio harveyi* (ATCC Acc. No. 33843).

Claim 46 (new): The method of claim 44 wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744).

Claim 47 (new): The method of claim 42 wherein the luminescent biological agent is selected from the group consisting of a luminescent bacteria, a luminescent fungi, a luminescent firefly extract, a luminescent anthozoan, a luminescent earthworm extract, a luminescent coelenterate extract and a luminescent crustacean.

Claim 48 (new): The method of claim 42 wherein the luminescent biological agent comprises a luminescent cell.

Claim 49 (new): The method of claim 42 wherein the luminescent biological agent comprises a genetically modified luminescent biological agent.

Claim 50 (new): The method of claim 49 wherein the genetically modified luminescent biological agent comprises an organism genetically engineered to include a luciferase gene.

Claim 50 (new): The method of claim 42 wherein the separation phase matrix is high performance liquid chromatography and the test sample is a soluble sample.

Claim 51 (new): The method of claim 42 wherein identifying further comprises photography.

Claim 52 (new): A method for chemically identifying a toxic substance in a sample using a luminescent biological agent, said method comprising the steps of:

- preparing a luminescent biological agent for use in conjunction with chromatography paper;
- obtaining a sufficient volume of the sample suspected to contain toxic substances to provide a test sample;
- separating the toxic substances of the test sample on a separation phase matrix to provide a first set of serial aliquot volumes;
- exposing said first set of serial aliquot volumes to said luminescent biological agent by spotting said serial aliquot volumes in an array or in a linear fashion on a sheet of chromatography paper and spraying said sheet with a suspension of luminescent biological agent;
- identifying the presence of said toxic substances in said first set of serial aliquot volumes by zones of luminescent inhibition on said chromatography paper;
- obtaining a second volume of the sample to form a second test sample;
- separating the toxic substances of the second test sample on another separation phase matrix to provide a second set of serial aliquot volumes; and
- determining the chemical identity of a separated toxic substance observed at areas of luminescent inhibition with said first set of serial aliquot volumes by analyzing a corresponding inhibition region with said second set of serial aliquot volumes.

Claim 53 (new): The method of claim 52 wherein the luminescent biological agent is a luminescent bacteria.

Claim 54 (new): The method of claim 53 wherein the luminescent bacteria is selected from the group consisting of *Photobacterium leiognathi*, *Photobacterium phosphoreum*, *Vibrio fischeri* (ATCC Acc. No. 7744) or *Vibrio harveyi* (ATCC Acc. No. 33843).

Claim 55 (new): The method of claim 54 wherein the luminescent biological agent is *Vibrio harveyi* (ATCC Acc. No. 33843).

Claim 56 (new): The method of claim 54 wherein the luminescent biological agent is *Vibrio fischeri* (ATCC Acc. No. 7744).

Claim 57 (new): The method of claim 52 wherein the luminescent biological agent is selected from the group consisting of a luminescent bacteria, a luminescent fungi, a luminescent firefly extract, a luminescent anthozoan, a luminescent earthworm extract, a luminescent coelenterate extract and a luminescent crustacean.

Claim 58 (new): The method of claim 52 wherein the luminescent biological agent comprises a luminescent cell.

Claim 59 (new): The method of claim 52 wherein the luminescent biological agent comprises a genetically modified luminescent biological agent.

Claim 60 (new): The method of claim 59 wherein the genetically modified luminescent biological agent comprises an organism genetically engineered to include a luciferase gene.

Claim 61 (new): The method of claim 52 wherein the separation phase matrix is high performance liquid chromatography and the test sample is a soluble sample.

Claim 62 (new): The method of claim 52 wherein the chemical identify of the separated toxic substance of the test sample is achieved by analyzing the corresponding inhibition region of the sample from the second set of serial aliquot volumes by nuclear mass spectrometry, infrared spectroscopy, mass spectroscopy or electron capture detection.

Claim 63 (new): The method of claim 52 wherein determining the chemical identity further comprises photography.